

The
AMAZING



EXHIBITION



TEACHERS'
RESOURCE KIT

Letter *of* Invitation.

Dear Teacher,

The Amazing Bodies Exhibition welcomes you and your class to uncover the astounding mysteries of life. Situated on Stirling Angus Hall, Adelaide Showground this new and exciting Exhibition is perfect for school excursions for all year levels.

With relevance to "Human Society and Its Environment" for year 6 and Health, Science and Biology courses for years 7-12, the Exhibition is an eye opening journey through the inner workings of the human and animal bodies, revealing the intricacies of the skeletal, muscular, nervous, urogenital, cardiovascular, digestive and respiratory systems.

Featuring over three hundred anatomical specimens, including thirty aesthetically posed whole body specimens as well as transparent vertical & horizontal slices, it is a captivating mix of art and science.

Using innovative plastination technology and display techniques, the Exhibition will take your students on a thought provoking journey that is intended to generate both an intellectual and emotional response and challenge them to engage in a deeper understanding of how the human and animal body works. Some of the highlights of our exhibit include the whole muscular body of a horse, the powerful jaws of the Siamese Crocodile and the lungs and heart of a Minke whale.

Comments from students who have visited our previous Exhibitions: "It's great! It's interesting how our body parts look like and work," a young girl wrote. "It teaches us about the effects of lifestyle choices and how we should take care of our body because it is so fragile," said a male 16 year old student.

It is a requirement that all students visiting The Amazing Bodies Exhibition receive permission from their parents to view the Exhibition. The enclosed permission form is to be distributed and collected from all students before attending the Exhibition. By entering the Exhibition with your students, you are acknowledging that all of their parents have given them permission to view the Exhibition.

The organisers will not be checking permission forms, but will trust that teachers have obtained all relevant parental/guardian permission. We hope our exhibit will provide you and your class with an informative and exciting learning experience.

Thank You.

The Organisers
The Amazing Bodies Exhibition Australian Tour - 2011

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Dear Parent / Guardian,

The Amazing Bodies Exhibition is an eye opening journey through the inner workings of the human and animal body, revealing the intricacies of the skeletal, muscular, nervous, urogenital, cardiovascular, digestive and respiratory systems. Featuring over three hundred anatomical specimens, including thirty aesthetically posed whole body specimens as well as transparent vertical & horizontal slices, the Exhibition is a captivating mix of art and science.

The Exhibition demonstrates, through comparative anatomy, the similarities and differences between different types of vertebrates in their way of life, biology and structure. Examining real specimens of humans and animals, students will go on a thought provoking journey that will generate both an intellectual and emotional response. The extensive range of specimens, together with informative audio - visual presentations shows the intricacies of life through how the body works.

Important information to know

- The specimens in the exhibit come from **animals who died of natural causes and voluntary body donors** who agreed that upon their death, their bodies could be used in this method.
 - The whole body specimens are without skin so that bones, muscles, tendons, nerves, blood vessels & organs can be observed and studied closely. **Eyes & genitalia remain.** Written descriptions accompany the majority of specimens.
 - Plastination is a process that replaces natural body fluids with special plastics. The resulting **preserved specimens are odourless and completely dry.**
Plastination allows the bodies to be fixed into life-like poses, illustrating how our bodies are structured and how they function when performing everyday activities.
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To learn more about the exhibition and to find the answers to some frequently asked questions, please visit our website at www.amazingbodies.com.au. After viewing the exhibit, it is likely your children will want to discuss this Exhibition with you.

The **AMAZING BODIES EXHIBITION** requires that all students visiting the Exhibition receive permission from their parents. By signing this form, you are acknowledging that your child has permission to view the Exhibition with a teacher or another representative from your child's school. If you do not wish your child to see this Exhibition, please do not sign this form.

I give _____ (*print your child's name*) permission to view
The AMAZING BODIES EXHIBITION currently held at Stirling Angas Hall, Adelaide Showground.

Parent / Guardian name (*please print*)

Parent / Guardian signature (*please print*)

Frequently Asked Questions

What is The AMAZING BODIES EXHIBITION?

The Amazing Bodies Exhibition is a first of its kind exhibition in which guests learn about comparative anatomy, physiology and health by viewing real human and animal specimens, preserved through an amazing method and scientific technique called “plastination.”

The preservation technique called “plastination” is where natural fluids are replaced with special plastics, enabling observation of many organs & systems under our skin. The Exhibition demonstrates, through comparative anatomy, the similarities and differences between different types of vertebrates and how they work inside.

To date, over 22 million people worldwide have seen such similar Exhibitions.

How is the Exhibition organised?

As you take a self-guided tour through The Amazing Bodies Exhibition, you can explore one body system at a time including the locomotive, nervous, respiratory, cardiovascular, digestive and reproductive systems. Whole body specimens are included through-out the Exhibition to show how these systems fit and function in humans and animals.

Informative audio-visual presentations are available to give detailed and engaging descriptions and provide an integrated learning experience.

Couldn't I learn just as much from books or models of Human & Animal Anatomy?

Until now viewing this type of detailed real-life anatomical display was the exclusive privilege of medical students & practitioners.

Extreme care and professionalism have been exercised in the preparation and production of each specimen during the process of plastination. A thin slice could take days of processing time, while whole body specimens may take months. Authentic specimens of this detail and calibre cannot be emulated in photos and textbooks. It is also an established fact that people relate better to real specimens like the plastinates rather than man-made artificial models.

What is Plastination?

Plastination is a modern scientific technique of preserving and replacing body tissues with plastic polymers while retaining the structure of tissues.

Invented by Dr. Gunther von Hagens, the plastination process replaces all the natural body fluids and fats with reactive plastics that are initially pliable, but then harden after infusion.

By hardening these plastics the specimens may be fixed into life-like poses, which illustrates how our bodies respond internally to everyday activities.

The plastination process of each specimen can take many thousands of “man-hours” and therefore the specimens are very valuable and expensive. Plastination ensures that all pathogens, bacteria & viruses that may occur in a body are totally destroyed leaving a perfectly sterile & safe specimen for educational purposes.

How many Plastinates are in the Exhibition?

The Exhibition features more than 300 authentic human and animal specimens including 30 aesthetically posed whole body animal specimens along with individual organs and transparent body slices.

Why are the Plastinates posed the way they are?

The poses of the plastinates have been carefully planned out to illustrate different anatomical and physiological features.

Where did the Specimens on display come from? Will we know personal details about the Specimens?

The specimens in this Exhibition are from voluntary body donors - individuals who bequeathed that, upon their death, their bodies could be used in this Exhibition for educational purposes. In making their donation, these voluntary donors agreed that all aspects of their identities, including age and cause of death would remain confidential.

All animals specimens in this Exhibition came from subjects that died from natural causes and were not harmed in any way to bring you this Exhibition.

Is this Exhibition appropriate for Children?

Over 22 million people have experienced similar Exhibitions worldwide, including millions of school children.

Nevertheless, due to the sensitive nature of this Exhibition, The Amazing Bodies Exhibition requires that children under 14 be accompanied by a responsible parent, guardian, teacher or school official. There may be displays in the exhibit that adults will need to explain to children in their care.

Unaccompanied children will not be allowed into the Exhibition.

Is this Exhibition appropriate for School Visits?

In all locations around the world where similar Exhibitions have been held, there has been extensive attendance by school groups, students and their families. Educational & health authorities recommend this Exhibition for children 7 years old and over while requiring that teachers obtain permission from a parent or guardian of each child to view the Exhibition. It is the responsibility of the school to ensure that permission has been obtained.

Due to the large number of school groups that will be attending the Exhibition, it will be necessary to pre-book attendance dates and times. This can be done by contacting Moshtix group ticketing on **1300 438 849**.

Regarding transport, there will be a loading zone and a bus drop off area for buses carrying school groups.

All booked student groups attending will receive a free audio guide of the Exhibition.

What are the Opening Hours of the Exhibition?

The Amazing Bodies Exhibition opens in Adelaide on Saturday March 5th and runs to the 8th of May.

The Exhibition will be open from 10am to 5pm Fri - Wed. 10am to 8pm Thurs.

Special out-of-hours viewing times are offered on a regular (advertised) basis together with special functions and public lectures by invited public health and scientific experts.

How long does it take to see the Exhibition?

Past experience has shown that it typically takes about 90 minutes to view and take in information of the Exhibition. Some school and special interest groups have taken many more hours viewing and examining our fascinating displays in more detail. It is not uncommon for art classes and artists to spend several days sketching and analysing the human and animal form in a way that is normally never possible.

How much does it cost to see the Exhibition?

Pricing has been set affordably at \$14 per student. School groups receive significant discounts on the admission price and accompanying teachers will be admitted free of charge (maximum - 1 per 15 students). Please see the website www.amazingbodies.com.au for further details and prices.

To avoid long queues and possible waiting, tickets can be purchased in advance through Moshtix on **1300 438 849**.

Tickets are also available for purchase through our Exhibition website www.amazingbodies.com.au.

Is the Exhibition accessible to People with Disabilities?

The venue is all on one level and there is ramp access throughout the precinct and to the car parks.

Can I take Photographs or Film in the Exhibition?

It is a condition of entry that visitors understand that photography & filming are strictly prohibited, except by approved & credentialed members of the media. This includes the use of mobile phones with cameras.

We thank you for your understanding. Food & drink (except bottled water) are also prohibited.

What other Materials are available for Educators?

There are several items available for purchase, including a catalogue and other materials in the shop located in the Exhibition.

All students & teachers attending the Exhibition as part of a "school group" booked through Moshtix or The Exhibition Box Office will receive complimentary electronic audio guide and headset to further enhance their visit to the Exhibition.

What is Vertebrate Life?

In the Animal Kingdom, life is classified into either vertebrates or invertebrates. While only 5% of all life, vertebrates are amongst the most dominant animals in the ecosystems of our planet.

The key characteristics that tie all vertebrates together are the vertebral column and a centralised system of nerves, with a distinct brain in the head and a spinal cord running down to the posterior. Because all vertebrates descended from a common ancestor, all vertebrate embryos have gills in their earliest stages of development.

Other characteristics that vertebrates share include distinct upper and lower jaws, a distinctly developed cardiovascular system for circulation and complex kidneys.

Despite fundamentally shared characteristics, the size, structure, biology and lifestyle of vertebrates differ greatly in the animal world. They are classified as: Agnatha (jawless fish), Chondrichthyes (Sharks), Osteichthyes (Salmon, carp), Amphibia (Frogs, salamanders), Reptilia (lizards, snakes, crocodiles), Aves (birds) and Mammalia (mammals).

Fish.

Fish, both cartilaginous sharks and bony teleosts are considered the

oldest form of vertebrates in the phylogenetic tree of life. With 22000 different species, fish comprise 48% of all vertebrates in total. They are defined by their cold bloodedness and breathing with gills in water.



Reptiles.

Characterised by their coldblooded circulation system, scaly skin and fully terrestrial reproductive behaviour, laying of amniote eggs, reptiles evolved from early amphibians and are the first truly terrestrial vertebrates.



Amphibians.

The first air-breathing vertebrate and the first to live on land, amphibians are believed to have evolved from lobe-finned fish making the switch to a terrestrial lifestyle about 360 million years ago. Despite this, amphibians still need to rely on water to reproduce.





Birds.

Believed to be the descendants of smaller dinosaurs, birds evolved from reptiles are characterised by feathers, warm blooded bodies, wings and a highly adapted skeletal and muscular structures designed for flight. There are currently over 9000 known species of birds around the world.



Mammals.

The latest branch of the vertebrate family to emerge; live birth, breast feeding and fur are what links the vast array of mammals together. From the tiniest rodents to the largest of whales, mammals come in every size and shape, live in every kind of way and hail from all types of habitats, due to their amazing adaptability.

What is PLASTINATION?

Plastination is a relatively simple process designed to preserve the body for educational and instructional purposes. Plastination, like many revolutionary inventions, is simple in concept:

“Plastination”, was developed by the German doctor, Gunther von Hagens in 1977 in order to educate people about their body in health and disease.

The specimen is first embalmed with a 5% formalin solution, and then dissected for the purposes of the demonstration. Next, fluids and fats are replaced by a concentration of ethanol and acetone. Following this, a vacuum pump extracts the acetone and replaces it with liquid plastic. Finally the specimen is adjusted to the proper position and gaseous curing agent is added to solidify the plastic.

Plastination Process

1

Fixation & Dissection

- **Fixation**
Specimens are fixed with 5% Formalin
- **Dissection**
Specimens are dissected according to our needs

Dehydration •

Bodily fluid and fat are replaced by ascending concentration of ethanol at Room Temperature and acetone in cold acetone bath

Defat •

Soluble fat molecules are replaced by acetone in warm acetone bath

Dehydration & Defat

2

3

Liquid Plastic & Solid Plastic

- **Forced Impregnation**
Acetone is extracted and gradually replaced with plastic by vacuum
- **Positioning**
Each structure is brought into the proper position
- **Gas Curing**

Getting to AMAZING BODIES

BY TRAM

Departs Adelaide from **Victoria Square** every 20 minutes, with the journey taking five-minutes to reach **Goodwood Road Station, Stop 7**. It is then a ten-minute walk from the tram stop to the **AEEC**.

BY BUS

Departs **Adelaide (Stop A2, North Terrace, Government House)** every ten minutes. Bus numbers are 210, 211, 213, 215, 216, T217, 218 and T219 Monday to Friday and 210, 214, 216 and 218 on weekends and public holidays. The journey takes approximately 15 minutes to reach the **Goodwood Road entrance (Bus stop 1 or 2)**.

BY TAXI

The **AEEC** is a five-minute taxi ride from the **Adelaide CBD** and a 15-minute journey from **Adelaide Airport**. Taxi ranks are located at the **Goodwood Road and Rose Terrace** entrances during all events.

BY TRAIN

The train is most suitable for those visitors attending **The Amazing Bodies Exhibition** which utilises the **Leader Street** entrance. Trains depart **Adelaide Railway Station, North Terrace**, every 30 minutes, with the journey taking nine minutes to **Goodwood Station**. It is then a ten-minute walk to the **AEEC**.

BY CAR

The **AEEC** is bounded by **Goodwood Road, Greenhill Road and Anzac Highway** and is easily accessible from all three arterial roads. On-site parking is available for approximately 2,000 cars. A parking fee of \$6.00 applies. Refer to the Event Calendar for parking arrangements for specific event.

Sample Lesson Notes

Before the day

- Divide the class into groups. Give each group a specific organ system to research.
- Ask each group to do some basic background research on the specific organ system and prepare a brief 3 minute talk on how the system works in humans, and in comparison to another animal of their choice in the Exhibition.

During the excursion...

Orientation

- Explain the rules of entry to the class and brief them on safety precautions.
- Ask students to look around for 20 minutes. It's okay if students don't get a chance to see everything.
- Discuss what students have seen. Use this discussion to give basic information about the Exhibition.
- Discuss specimens that the students found most interesting, ask them why that is so.

Consolidation

- Go through each of the organ systems together as a class. Use the notes given in this booklet as a start to explain any questions the class might have.
- Point out specific organs, muscles or bones on key specimens, (crocodile's jaws, or horse's muscles, or whale's lungs etc). Ask the class to name them. Prompt students to explain how they work without the help of the audio guide.
- Ask different groups to give their presentation.
- Open the class to ask the presenting group questions.
- Sample questions: How do the organs change in shape and structure in each type of vertebrate? How does this affect its function? How does this fit into the overall lifestyle of each type of animal?

Reinforcement

- Ask the class if they see any commonalities between each of the types of animals displayed.
- Reinforce the idea that all vertebrates have similar organ systems but these may differ in function or purpose.
- Hand out the activity sheets and give the students time to answer the questions. Allow them to wander round the Exhibition while finishing the work sheet.
- If there is time, go through the worksheet together and allow students to share and discuss their answers with each other and what they thought about the exhibit in general.

Yr 10-12 Worksheet

1. Are the bodies in the exhibition real or are they made of plastic?

2. Give a detailed description of the function of the following organs. Draw the structure in the animal of your choice.

The
Heart

The
Brain

The
Lungs

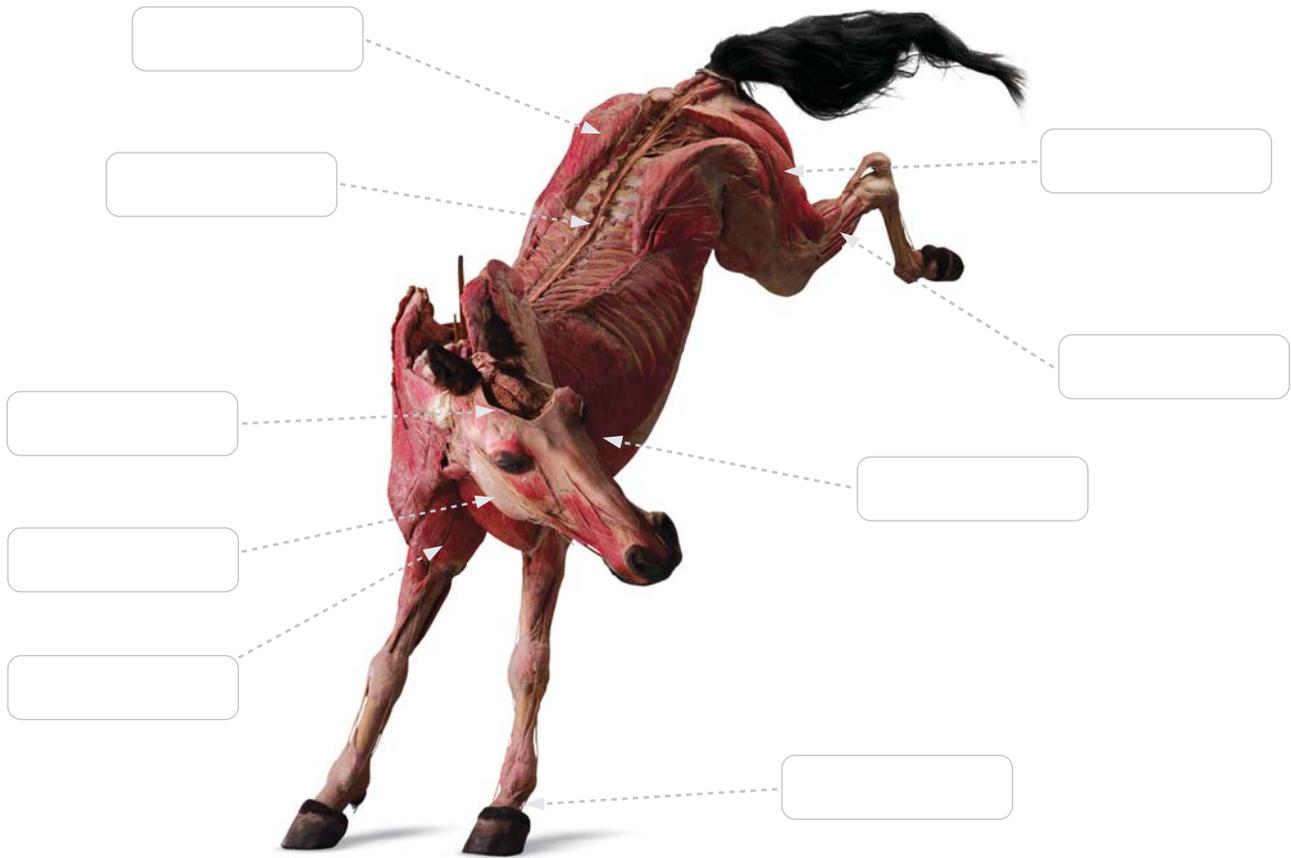
The
Stomach

The Eyes

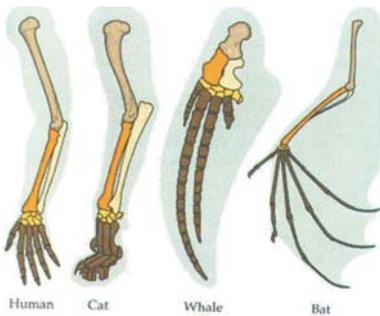
3. What is the difference between single and double circulatory systems? How does it affect the activity of the animal? Give examples of each.

4. List three interesting facts you learnt throughout the display and explain why they interest you:

5. Name parts of the muscular and nervous system of the horse -



6. The picture below displays the limbs of different mammals. Explain how each different limb functions. Are there similarities in structure? Explain.



Partial Answers

1. The specimens are real tissue treated with the special plastination process which replaces the bodily oils and liquids with plastics.

2. Specific organs of each specimens require further specification, but sample answers include:

Heart: is responsible for pumping blood throughout the blood vessels, in vertebrates is a muscle that contracts involuntarily and regularly. It could have many chambers depending if it the animal it belongs to has single or double circulation.

Brain: is the centre of the nervous system in all vertebrates and controls the other organ systems of the body. It does this either through nerve signaling for muscle movement or chemically through the secretion of hormones. The brain functions in this manner to allow the animal to respond quickly to changes in the environment.

Lungs: are used for gas exchange (breathing). They exchange oxygen from the atmosphere into the bloodstream, and release carbon dioxide from the bloodstream back to the atmosphere. Air-breathing lungs are thought to have evolved from the time of the amphibians and were adapted from the air bladder in fish.

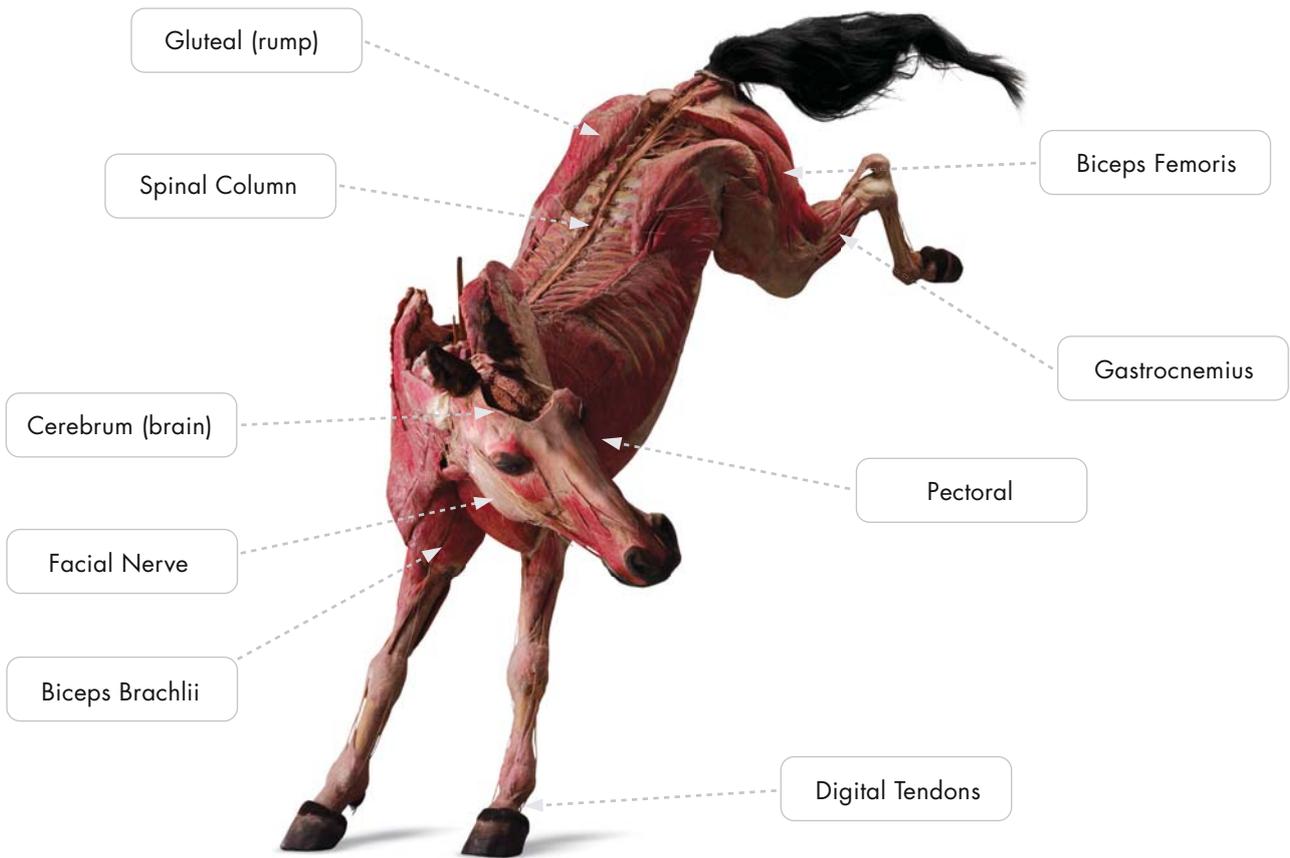
Stomach: is usually a hollow, dilated part of the alimentary canal which functions as the primary organ for digestion by secreting protein-digesting enzymes and strong acids and churns food by smooth muscular contractions before sending partially-digested food to the small intestine for further break down and absorption.

Eyes: are organs that detect light and send corresponding electrical impulses along the optic nerve to the visual and other areas of the brain.

3. In single-circuit systems such as fish, blood is pumped through the capillaries of the gills and on to the capillaries of the body tissues. The heart is a single pump system, consisting of two chambers, with significant overlap between oxygen rich and poor blood.

In a double circulatory system, blood flows through two distinct and separate systems of pulmonary circulation and systemic circulation. Most animals living out of the water (reptiles, birds and mammals) need a double circulatory system for direct and effective access to oxygen.

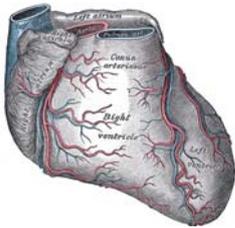
6.



Yr 6-9 Worksheet

1. Are the bodies in the exhibition real or are they made of plastic?

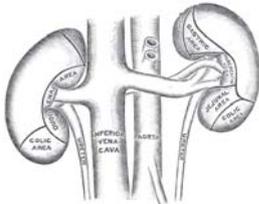
2. Match the pictures of the organs with their names -



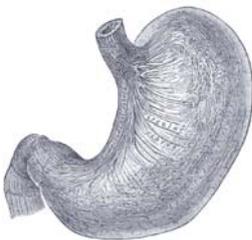
Stomach



Spine



Brain



Heart



Kidney

3. What do you like the most about the Exhibition and list the things you found interesting?

4. Some animals have extra organs in their digestive systems. What are they called? What do they do? Give an example of an animal displayed here that has one?

5. Name the body parts of the horse -



Partial Answers

1. The specimens are real tissue that has been treated with the special plastination process which replaces the bodily oils and liquids with plastics.

4. Some birds have crops and gizzards. Crops are storage sacks for semi digested food, while the gizzard is the second chamber of a bird's stomach that grinds and digest tough food. Some mammals such as cows, sheep or giraffes have many stomach chambers. Grass is softened in the first stomach and then regurgitated to be chewed again, with each chamber further breaking down the food.

5.

